DESCRIPTION
OF
REMOTE PICK-UP ANTENNA

THE 'WHIP' TYPE ANTENNA IS SIDE MOUNTED AT THE TOP OF THE NUMBER ONE (NORTH) TOWER. THE INSTALLATION IS SUCH THAT THE TIP OF THE RPU ANTENNA DOES NOT EXCEED THE HEIGHT OF THE TOWER.

ANDREW TYPE LDF 4-50A, ONE-HALF INCH FOAM HELIAX COAXIAL CABLE IS SECURELY ATTACHED TO THE RPU ANTENNA, AND SECURED TO THE TOWER AS IT TRAVERSES DOWN TO THE BASE OF THE TOWER. A 450 mHz ISOCOUPLER IS UTILIZED TO PREVENT ANY COUPLING OF THE STATIONS' 1270 kHz ENERGY ACROSS THE SERIES FED TOWERS' BASE INSULATOR.

ALL OTHER ASPECTS, WITH THE EXCEPTIONS OF THE CHANGES TO THE SAMPLING SYSTEM DISCUSSED IN THIS REPORT, ARE AS INDICATED IN THE 1969 FULL PROOF OF PERFORMANCE.

DIRECTIONAL ANTENNA
PARTIAL PROOF OF PERFORMANCE

RADIO STATION KIOX
BAY CITY, TEXAS

JULY 1994

TECHNICAL QUALIFICATIONS

This directional antenna partial proof of performance was conducted and prepared by Oliver T. Green, Technical Director for North Star Communications, Inc., Licensee of KIOX (AM), Bay City, Texas. All statements and representations of fact contained in the attached engineering report are true and correct of his own knowledge and belief.

Oliver T. Green herein states that:

He has held a FCC First Class Radio-Telephone license (General Class, license #PG-10-12299) since 1959. He has attended Louisiana State Vocational School, studying radio and television electronics. He has held past certification in the state of Florida as an instructor of Radio and Television Electronics. He attended Chalmette Community College, Chalmette, Louisiana, studying mathematics and trigonometry.

He has worked as a practicing Broadcast Technical Consultant in the City of Amarillo, State of Texas. He was a partner in the consulting firm of Green/Zellner, Inc., Amarillo, Texas.

He has been employed in the broadcast industry since 1959, within the technical areas of various stations, and his qualifications are a matter of record with the Federal Communications Commission.

Respectfully submitted,

Oliver T. Green

Oliver T. Green
July 12, 1994

INTRODUCTION

THE LICENSEE OF RADIO STATION KIOX [AM] BAY CITY, TEXAS, NORTH STAR COMMUNICATIONS, INC., HAS CONDUCTED THIS [AM] DIRECTIONAL ANTENNA PARTIAL PROOF-OF-PERFORMANCE FOLLOWING PHYSICAL AND ELECTRICAL REPAIRS TO CORRECT PATTERN AND OPERATING PARAMETER INSTABILITIES.

COMMENTS

(1) A CHECK OF ALL RF AMMETERS AGAINST A WESTON MODEL 104 CURRENT STANDARD WITH 0.50% CERTIFIED ACCURACY REVEALED THAT, WITH THE EXCEPTION OF THE DIRECTIONAL NIGHT-TIME COMMON POINT AMMETER, ALL THREE BASE CURRENT AMMETERS WERE PROVIDING INACCURATE INDICATIONS. THESE METERS WERE REPAIRED AND CALIBRATED BY STRAUGHN ELECTRONICS, INC., BEAUMONT, TEXAS.

(2) BROKEN GROUND STRAPS WERE FOUND AT THE BASE OF THE NUMBER TWO AND NUMBER THREE TOWERS. THESE WERE REPAIRED WITH SHORT SECTIONS OF COPPER STRAP AND SILVER SOLDER.

(3) THE ALUMINUM SAMPLING LOOPS WERE EXAMINED AND ALL ELECTRICAL CONNECTIONS WERE CLEANED AND RE-CONNECTED. THE LOOP BONDING TO THE TOWERS WAS FOUND TO BE ACCOMPLISHED BY STAINLESS STEEL HOSE CLAMPS. THE THE COAXIAL SAMPLING LINES WERE CONNECTED TO THE SAMPLING LOOPS IN A RATHER CRUDE MANNER.

IT BECAME APPARENT FOLLOWING REPEAT SAMPLING SYSTEM WORK-OVERS ON AT LEAST TWO OCCASIONS, DURING EFFORTS TO STABILIZE THE ARRAY AND ADJUST THE PATTERN, THAT RELATIVELY POOR LOOP DESIGN, AND THE EFFECTS OF ELECTROLYSIS DUE TO COMBINED CONNECTIONS OF ALUMINUM, COPPER AND STEEL, MANDATED THAT THE LOOPS BE REPLACED OR ANOTHER METHOD OF PROVIDING AN ACCEPTABLE ANTENNA CURRENT SAMPLE TO THE ANTENNA MONITOR WAS NEEDED.

THE DELTA TOROIDAL SAMPLING COILS WERE SELECTED BECAUSE THEY COULD BE INSTALLED INSIDE THE ATU BUILDING AT THE BASE OF EACH TOWER, PROTECTING THE SYSTEM FROM WEATHER DETERIORATION DUE TO EXPOSURE TO THE HOSTILE GULF COAST CLIMATE.

THE SAMPLING LOOPS, AND TRANSMISSION LINES TRAVERSING DOWN THE TOWER FROM THE SAMPLING LOOPS TO THE ISOLATION COILS, WERE REMOVED FROM THE TOWERS. THE TOROIDAL SAMPLING COILS WERE INSTALLED, IDENTICALLY, AT THE OUTPUT OF THE ANTENNA TUNING UNITS' RF FEED TO THE RESPECTIVE TOWER. THE SAMPLING LINES WERE ATTACHED TO THE TOROIDAL OUTPUT CONNECTOR.

(4) THE ANTENNA ISOLATION COILS WERE RETAINED IN THE SYSTEM FOR USE AS STATIC DRAINS FOR THE TOWERS BY PROVIDING A CONNECTION FROM THE RF FEED LINE TO THE COIL. THE ISOLATION COIL GROUNDS (NO. 12 COPPER WIRE) WAS REPLACED WITH TWO INCH COPPER STRAP, AND THE ISOLATION COILS WERE ADJUSTED SO AS TO MINIMIZE THIER PRESENCE TO THE RADIO FREQUENCY PROPERTIES OF THE SYSTEM (ANTIRESONATED).

CONSIDERABLE TIME AND DETAIL WAS GIVEN TO PHYSICAL AND ELECTRICAL MEASUREMENTS TO MAKE SURE THE SAMPLING LINES WERE AS NEAR EQUAL, AS COULD BE DETERMINED. AN EXISTING SECTION OF RG-8U (DISSIMILAR COAXIAL CABLE) WAS REMOVED FROM THE ANTENNA MONITOR END OF THE NUMBER THREE SAMPLING LINE. ELECTRICAL MEASUREMENTS, AND PHYSICAL MEASUREMENTS AS CLOSE AS POSSIBLE, WERE MADE. IT WAS DETERMINED THAT THE NUMBER THREE LINE WOULD NEED LENGTHENING. TO CONFIRM THIS, THE NUMBER ONE SAMPLING LINE WAS UNCOILED, AS WELL AS THE NUMBER TWO SAMPLING LINE, FOR PHYSICAL COMPARISON TO THE NUMBER THREE LINE.

THEN USING THE NIGHT-TIME DIRECTIONAL REFERENCE TOWER NUMBER TWO FOR ANTENNA MONITOR COMPARISONS, THE NUMBER ONE AND NUMBER THREE SAMPLING LINES WERE, IN TURN, CONNECTED TO THE NUMBER THREE TOWER SAMPLING COIL. THE DIFFERENCE IN PHASE BETWEEN THE LINES, AS INDICATED BY THE ANTENNA MONITOR, REVEALED THAT THE NUMBER THREE LINE WAS 5.0 DEGREES MORE POSITIVE THAN THE NUMBER ONE LINE. THE LENGTH LINE NEEDED TO PRODUCE AN IDENTICAL PHASE READING WAS CALCULATED, AND WAS ADDED TO THE NUMBER THREE SAMPLING LINE. RADIO-FREQUENCY BRIDGE MEASUREMENT COMPARISONS WERE THEN MADE AND CONFIRMED SATISFACTORY EXACTNESS OF THE SAMPLING LINE CHARACTERISTICS OF ALL THREE TOWERS.

THE SAMPLING SYSTEM FOR THIS ARRAY DOES NOT HAVE PHASE STABILIZED LINES. THE ANDREW FHJ-1 FOAM HELIAX LINES WERE INSTALLED JUST PRIOR TO THE 1969 ANTENNA SYSTEM PROOF OF PERFORMANCE. THUS, IT CANNOT QUALIFY AS A TYPE ACCEPTED SYSTEM FOR REMOTE CONTROL REQUIREMENTS, NOR RELAXATION OF THE MONTHLY MONITOR POINT MEASUREMENTS.

(5) THE RF COMPONENTS IN THE ANTENNA SYSTEM PHASOR AND ANTENNA TUNING UNITS WERE EACH MEASURED WITH AN RF BRIDGE. THIS RESULTED IN THE REPLACEMENT OF FOUR CAPACITORS [ONE IN THE PHASOR, TWO IN THE NNUMBER ONE TOWER ATU AND ONE IN THE NUMBER THREE TOWER ATU. THE RPU ANTENNA ISOCOUPLER [450 mHz] ON THE NUMBER ONE TOWER WAS ALSO REPLACED.

(6) NORTH STAR COMMUNICATIONS, THE LICENSEE OF KIOX (AM), ACQUIRED AND UPGRADED AN (FM) STATION [KIOX-FM] THAT NECESSITATED THE ERECTION OF A 36.58 METER AGL STL TOWER AT THE KIOX STUDIO/KIOX (AM) TRANSMITTER SITE. SPECIAL CARE WAS TAKEN TO ASSURE THAT THE STRUCTURE WOULD NOT PRESENT A RE-RADIATION PROBLEM.

THE STL TOWER WAS INSTALLED WITH A LARGE BASE INSULATOR AND THE GUY WIRES ARE INSTALLED WITH INSULATORS AT APPROPRIATE INTERVALS. A VERY HIGH IMPEDANCE STATIC DRAIN CHOKE WAS FABRICATED BY KENTRONIC LABRATORIES, INC., FOR THIS SPECIFIC TOWER. THE STATIC DRAIN WAS INSTALLED ACROSS THE BASE INSULATOR. THE STL ANTENNA/TRANSMISSION LINE UTILIZES A 950 mHz ISOCOUPLER TO EXIT THE BASE OF THE STL TOWER.

THE STRUCTURE EXHIBITS EXCELLENT TRANSPARENCY TO THE KIOX ANTENNA ARRAY.

ARRAY ADJUSTMENT AND MEASUREMENT

THE KIOX NIGHTTIME DIRECTIONAL ANTENNA CONSISTS OF THREE TOWERS WITH AN IN-LINE CONFIGURATION. TWO OF THE TOWERS ARE SLENDER, UNIFORM TRIANGULAR CROSS-SECTION, GUYED STRUCTURES. THE THIRD TOWER IS ONE OF THE ORIGINAL FOUR LEGGED SELF-SUPPORTING TAPERED STRUCTURES. GUY WIRES HAVE BEEN ADDED TO THIS TOWER. DUE TO THE DIFFERENCES IN THE PHYSICAL AND ELECTRICAL PROPERTIES OF THE NUMBER THREE TOWER, ADJUSTMENT OF THIS ARRAY IS COMPLICATED BY SOMEWHAT DIFFERENT RATIO'S THAN THEORETICAL AND MEASURED/CALCULATED SYSTEM VALUES THAT WOULD BE EXPECTED. CONSIDERABLE REPEATED EFFORT IS REQUIRED IN THE TUNING OF THE ARRAY, AND RELATED NUMEROUS FIELD MEASUREMENTS AND ANALYSIS WORK, TO BRING THE PATTERN INTO COMPLIANCE.

AS NOTED BY THE CONSULTANT WHO CONDUCTED AND PREPARED THE LAST PARTIAL PROOF OF PERFORMANCE DATED AUGUST, 1985, THIS SYSTEM IS A DIFFICULT ONE TO CONQUER. THE PATTERN IS HIGHLY SUPPRESSED OVER AN ARC OF SEVENTY-TWO DEGREES. WHILE THERE IS NO LESS THAN TEN RADIO COMMUNICATIONS TOWERS AT VARYING DEGREES OF PROXIMITY, THE MOST SUSPECT OF THESE TOWERS THAT WOULD BE OF CONCERN FOR RE-RADIATION IS APPROXIMATELY 1.45 KILOMETERS FROM THE KIOX ARRAY, OFF-SET SLIGHTLY EAST OF THE 342 DEGREE TRUE BEARING, IN THE NULL AREA OF THE PATTERN. HOWEVER, EFFORTS MADE TO DETECT RE-RADIATION FROM THIS STRUCTURE COULD NOT CONFIRM A PROBLEM IN THIS REGARD. IT IS BELIEVED THAT SUMMATION FIELDS RECEIVED BY THE FIELD METER ANYWHERE IN THIS HIGHLY SUPPRESSED ARC DESERVES DUE CONSIDERATION CONCERNING THE CONSIDERABLE SCATTER THAT THESE RADIALS HAVE ALWAYS EXHIBITED WITHIN THE SUPPRESSION ARC.

THE MEASURED FIELDS SUBMITTED IN THIS REPORT WERE MADE WITH A NEMS-CLARK 120-E FIELD INTENSITY METER MOUNTED ON A TRIPOD. EACH RADIAL BEARING WAS ESTABLISHED FROM 7.5 MINUTE TOPOGRAPHIC MAPS, AT CLOSE-IN POINTS, WHERE THE ANTENNA ARRAY WAS EASILY VISIBLE. WITH THE FIELD METER LOOP ANTENNA POINTING TO THE CENTER TOWER OF THE ARRAY, A RELATIVE READING WAS ESTABLISHED ON A COMPASS ATTACHED TO THE FIELD METER. REMOVAL OF THE COMPASS FROM THE FIELD METER CAUSED NO CHANGE IN THE MEASURED FIELD.

THE ESTABLISHED COMPASS READING FOR EACH RADIAL WAS THEN USED TO PROPERLY ORIENT THE FIELD METER TOWARDS THE CENTER OF THE ANTENNA ARRAY FOR RADIAL POINTS FIELD MEASUREMENTS OF ALL CORRESPONDING SUPPRESSED ARC RADIALS FIELD MEASUREMENTS. ADDITIONALLY, A MEASURED, LINEAR DISTANCE OF 5,280 FEET [1.6093 kilometer] WAS ESTABLISHED ON A STRAIGHT, SMOOTH SURFACE ROADWAY, AND THE VEHICLE/ODOMETER USED FOR THESE MEASUREMENTS WAS CHECKED AGAINST THE MEASURED MILE BY DRIVING THE COURSE TEN TIMES AND AVERAGING THE ODOMETER READING TO THE NEAREST HUNDREDTH. ALL DISTANCES TO SPECIFIC POINTS WERE MULTIPLIED BY A FACTOR OF 1.034. TO DETERMINE THE ODOMETER READINGS NEEDED TO ARRIVE AT THE POINT.

FLOODED RICE FIELDS, POSTED AREAS WITH LOCKED GATES, PRIVATE RANCHES, AND DANGEROUS SNAKE INFESTED AREAS OF DENSE GROWTH HAS LIMITED ACCESS TO DESIRABLE MEASUREMENT POINTS IN THE ADJUSTMENT AND ANALYSIS OF THIS SYSTEM.

MEASURED FIELDS AT EACH OF THE FOUR KIOX MONITOR POINTS FOLLOWING ADJUSTMENT OF THE ARRAY ARE:

RADIAL	POINT	DIST. km / mi		1994mV/m	LIC.MAX.
12 deg.	4	5.95	3.70	1.91	2.89mV/m
162 deg.	3	2.98	1.85	32.86	38.0mV/m
265 deg.	5	4.35	2.7	80.30	85.0mV/m
342 deg.	9	8.61	5.35	1.08	1.60mV/m

THEORETICAL AND OPERATING SPECIFICATIONS:

THEORETICAL FIELD RATIO	0.51	1.00	0.51
THEORETICAL PHASING	35 deg.	0.00 deg.	-35 deg.
BASE CURRENT AMPS.	1.0	2.0	1.48
BASE CURRENT RATIO	0.500	1.0	0.740
ANTENNA MONITOR PARAMETERS	41.2/+32	80/0	56/-21.5
LOOP CURRENT RATIOS	0.515	1.0	0.700
TOWER DESIGNATIONS	No. 1(N)	No. 2(C)	No. 3(S)

THE DIFFERENCES BETWEEN THEORETICAL AND OPERATING PARAMETERS ARE BELIEVED TO BE THREE-FOLD.

(1) A REVIEW OF STATION AND COMMISSION FILES REVEALS THAT WHEN THE ORIGINAL NUMBER ONE AND NUMBER TWO SELF-SUPPORTING TOWERS WERE DESTROYED BY A STORM, THE BASES OF THE TWO SLENDER, GUYED TOWERS WERE OFF-SET FROM THE EXACT CENTER-LINE OF THE ARRAY BY APPROXIMATELY THREE FEET.

(2) THE DIFFERENCES IN DRIVE IMPEDANCES OF THE ANTENNAS, DUE TO THE PRESENCE OF THE NUMBER THREE SELF-SUPPORTING TOWER, AS WELL AS DIFFERENT CURRENT DISTRIBUTATION AND RADIATION CHARACTERISTICS OF THIS LARGE, TAPERED TOWER, RELATIVE TO THE SLENDER, TRIANGULAR CROSS-SECTIONED NUMBER ONE AND NUMBER TWO TOWERS.

(3) WHILE THE TOROIDAL SAMPLING COILS ARE MOUNTED EXACTLY THE SAME AT EACH ANTENNA, THE RF. FEED LINE ARRANGEMENT TO THE NUMBER THREE TOWER TRAVERSES A MUCH LONGER HORIZONTAL PATH TO EACH LEG OF THE TOWER VIA A FEED-LINE TO THE CENTER OF THE BASE OF THE LARGE TOWER. THEN, FROM THIS CENTER POINT, TO THE LEGS OF THE TOWER IN A STAR COUNTERPOISE RF. FEED ARRANGEMENT.

THUS, THE PHASE OF THE TOWER CURRENT INDICATED BY THE TOROIDAL CURRENT TRANSFORMER SAMPLE WOULD BE MORE POSITIVE THAN IF IT WERE POSSIBLE TO MONITOR PAST THE COMBINED DELAY EFFECTS OF THE FEED-LINE ARRANGEMENT OF THIS TOWER WITH THE TOROIDAL SAMPLING UNITS.

FIELD INTENSITY MEASUREMENTS

AFOREMENTIONED DIRECTIONAL ANTENNA ADJUSTMENTS PRODUCED ANTENNA CURRENTS AND ANTENNA MONITOR INDICATIONS AS TABULATED ELSEWHERE IN THIS REPORT. COMMON POINT RESISTANCE WAS SET AT 50.0 OHMS, AND 4.65 AMPERES OF CURRENT WAS MAINTAINED IN THE COMMON POINT DURING FIELD INTENSITY MEASUREMENTS. OPERATING POWER WAS HELD AT 1,080 WATTS INTO THE COMMON POINT.

ALL FIELD INTENSITY MEASUREMENTS WERE MADE BY OLIVER T. GREEN ON THE DATES AND TIMES INDICATED, DURING DAYTIME HOURS. A NEMS-CLARKE TYPE 120E FIELD INTENSITY METER, SERIAL NO. 1593, LAST CALLIBRATED BY M.P. INSTRUMENTS COMPANY ON FEBRUARY 2, 1991, WAS USED.

GRAPH ANALYSIS OF MEASUREMENTS UTILIZED GRAPH 16A OF FCC RULE 73.184. TEN POINTS, OR AS MANY POINTS AS WERE ACCESSIBLE, WITHIN 16 KILOMETERS [TEN MILES], OR FURTHER WHERE NECESSARY, WERE TAKEN AND COMPARED TO 1969 FIELDS AT THE SAME NUMBERED POINT FOR RATIO.

RESULTS OF ARRAY ADJUSTMENTS

RADIAL BEARING DEGREES	1969 ND/Eo (Mi)	1969 DA/Eo (Mi)	1969 DA/ND Ratio	1994/1969 Ratio of DA-Fields	1994 DA/Eo (Mi)	1994 DA/Eo (Km)
0.0	240	4.60	0.0192	1.4256	6.56	10.56
12.0	250	6.60	0.0267	1.0437	6.89	11.09
17.7	240	8.70	0.0363	0.9356	8.14	13.10
86.0	220	370	1.6836	1.0137	375.07	603.63
108.0	175	280	1.6036	1.0008	280.22	450.98
162.0	240	68.6	0.2857	0.9853	67.59	108.78
200.0	180	166.5	0.9249	1.0133	168.71	271.52
240.0	220	374	1.7000	0.9829	367.60	591.61
265.0	215	243	1.1295	1.0207	248.03	399.20
306.3	250	5.5	0.0220	1.1586	6.37	10.25
312.0	235	5.5	0.0235	1.0604	5.83	9.38
324.0	250	6.9	0.0277	0.8813	6.08	9.79
342.0	240	8.04	0.0334	0.9847	7.92	12.75

COLUMN TWO ABOVE IS THE INVERSE DISTANCE FIELD AT ONE MILE THAT WAS DETERMINED FROM NON-DIRECTIONAL MEASUREMENTS OF THE 1969 FULL PROOF-OF-PERFORMANCE REPORT. COLUMN THREE IS THE NIGHT-TIME DIRECTIONAL 1969 INVERSE DISTANCE FIELD AT ONE MILE FOR THE SPECIFIED RADIAL BEARING. THE FOURTH COLUMN IS THE 1969 AVERAGE DA/ND RADIAL RATIO. COLUMN FIVE IS THE 1994/1969 DIRECTIONAL FIELDS AVERAGE RATIO. THE SIXTH COLUMN IS THE 1994 DIRECTIONAL, RADIAL INVERSE DISTANCE FIELDS AT ONE MILE. COLUMN SEVEN IS THE TABULATED COLUMN SIX DATA CONVERTED TO THE METRIC SYSTEM.

DATA ON IMPEDANCE MEASURING EQUIPMENT

INSTRUMENT	MANUFACTURER	RATED ACCURACY
Radio Frequency Synthesizer/Detector Type SD-31	Potomac Instruments	0.005%
Operating Impedance Bridge Model OIB-1	Delta Electronics	2.0% + 1.0 ohm
1.3 gHz Frequency Counter, Model 1856	B&K Precision	TCXO TIME BASE +1.0 ppm, Zero to 50 deg.C.

RESISTANCE MEASUREMENT PROCEEDURE

FOR ANTENNA SYSTEM MEASUREMENTS OF RESISTANCE, THE LEAD RUNNING DIRECTLY FROM THE ANTENNA AMMETER, OR COMMON POINT AMMETER, TOWARD THE ANTENNA WAS REMOVED FROM THE METER TERMINAL AND CONNECTED TO A RADIO-FREQUENCY BRIDGE. A SIGNAL GENERATOR, PRODUCING EACH DESIRED FREQUENCY, WAS FED INTO THE BRIDGE. MEASUREMENTS WERE MADE OF THE SYSTEM EVERY FIVE KILOHERTZ FROM 1240 TO 1300 KILOHERTZ. NULL INDICATIONS OF THE RADIO-FREQUENCY BRIDGE WERE TAKEN FROM THE POTOMAC INSTRUMENTS SD-31 RECEIVER/DETECTOR. THE BRIDGE AND RECEIVER/ DETECTOR WAS OPERATED AS PRESCRIBED IN THE MANUFACTURERS' INSTRUCTION MANUALS. BRIDGE INDICATIONS OF BOTH RESISTANCE AND REACTANCE ARE RECORDED FOR EACH CONDITION OF BALANCE, AND FROM THE DATA GRAPHS WERE CONSTRUCTED. WHERE THE CURVE OF RESISTANCE INTERSECTS THE OPERATING FREQUENCY THE SYSTEM RESISTANCE IS FOUND. THIS VALUE IS INDICATED ON EACH GRAPH.

DESCRIPTION OF ANTENNA SYSTEM

A FULL DESCRIPTION OF BOTH GROUND SYSTEM AND TOWERS IS CONTAINED IN THE KIOX FULL ANTENNA PROOF REPORT OF 1969 NOW ON FILE. IT HAS BEEN DETERMINED THAT AN RPU ANTENNA WAS SIDE MOUNTED ON THE NUMBER ONE TOWER SHORTLY AFTER THE 1985 PARTIAL PROOF OF PERFORMANCE WAS CONDUCTED.PLEASE NOTE EXHIBIT 7-A, ATTACHED.

TABULATION OF FIELD INTENSITY MEASUREMENTS FOR ANTENNA PARTIAL PROOF-OF-PERFORMANCE

KIOX - BAY CITY, TEXAS
1270 KHZ, 1.0 KW, DA-N

RADIAL 0 DEGREES TRUE

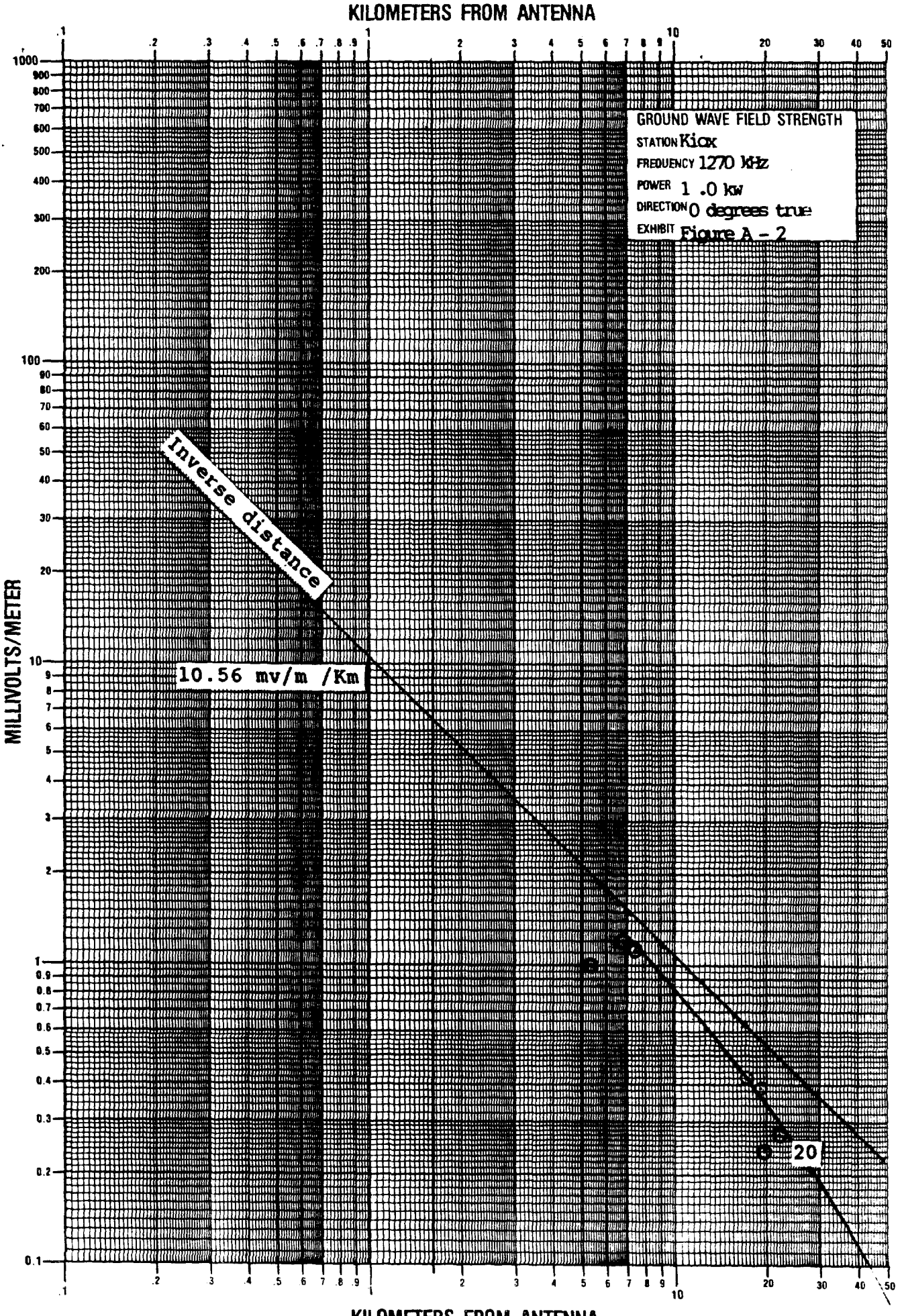
POINT	MILES/KILOMETERS		TIME	1969 Field	1994 Field	RATIO of Fields	LOG of Ratios
7	3.25	5.25	1045	1.30	1.00	0.7692	-0.1139
8	4.25	6.84	1105	0.90	1.20	1.3333	0.1249
9	4.60	7.40	1110	0.36	1.15	3.1944	0.5044
13	10.70	17.22	1345	0.30	0.42	1.4000	0.1461
14	11.85	19.07	1336	0.22	0.39	1.7727	0.2486
15	12.25	19.71	1329	0.20	0.24	1.2000	0.0792
16	12.55	20.20	1320	0.22	0.27	1.2273	0.0889
							1.0782

1.0782/7 = 0.1540 [ANTILOG = 1.4256]

1969 Field = 4.60 mV/m

1994 Field = 4.60 X 1.4256 = 6.56 mV/m

Fields measured May 18, 1994



Graphs and graph paper should not be copied. Office copiers introduce geometric distortions which will affect accuracy. Copies for submission to the FCC and station files should only be made after all data have been plotted.

TABULATION OF FIELD INTENSITY MEASUREMENTS FOR ANTENNA PARTIAL PROOF-OF-PERFORMANCE

KIOX - BAY CITY, TEXAS
1270 KHZ, 1.0 KW, DA-N

RADIAL 12 DEGREES TRUE

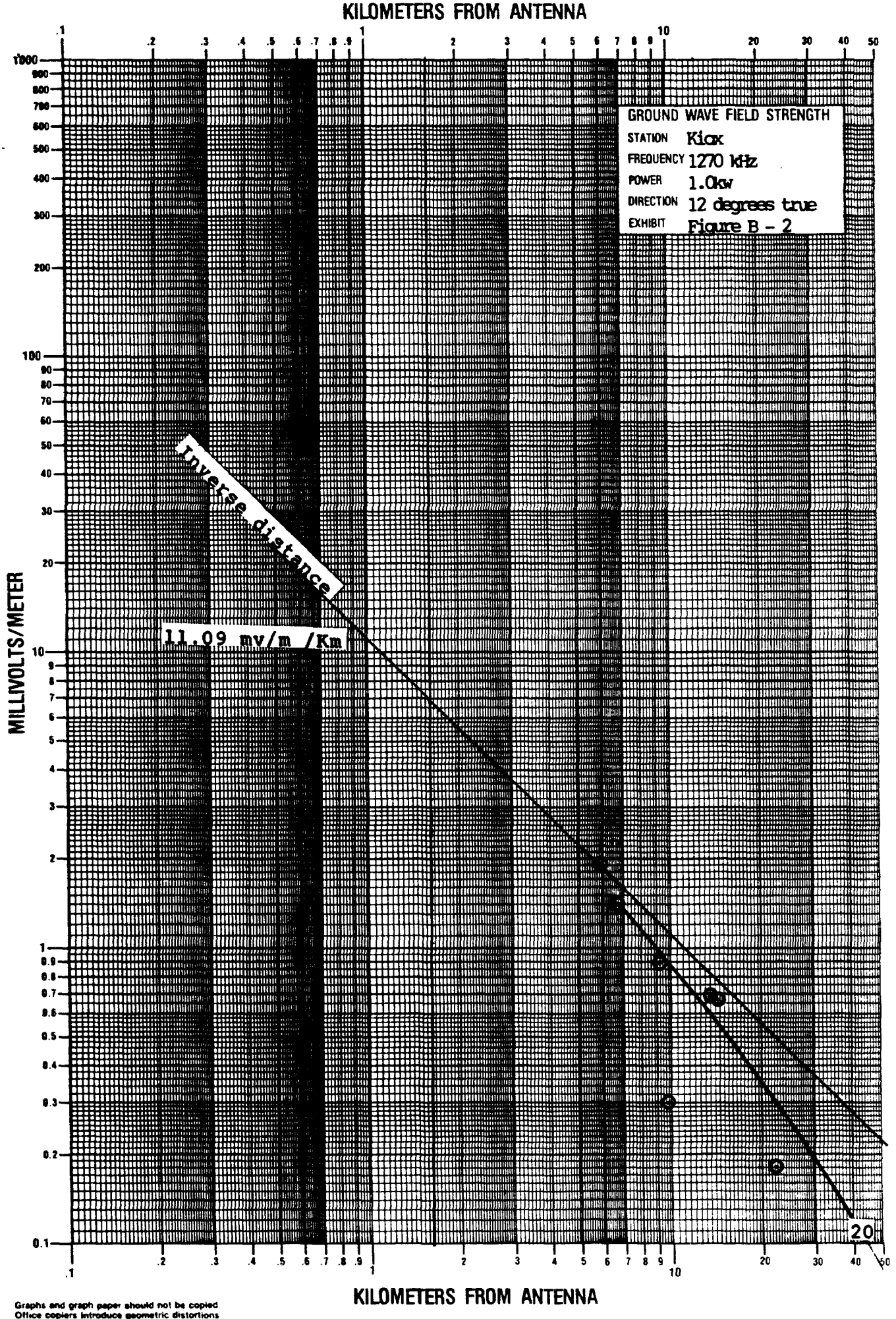
POINT	MILES / KILOMETERS		TIME	1969 Field	1994 Field	RATIO of Fields	LOG of Ratios
4 (MP)	3.70	5.95	1443	2.25	1.95	0.8667	-0.0621
5	5.15	6.68	1449	1.15	1.40	1.2174	0.0854
6	5.70	9.17	1505	1.00	0.89	0.8900	-0.0506
7	6.05	9.74	1530	0.35	0.30	0.8571	-0.0669
8	8.10	13.04	1010	0.50	0.69	1.3800	0.1399
9	8.90	14.32	1025	0.60	0.62	1.0333	0.0142
10	13.80	22.21	1105	0.15	0.18	1.2000	0.0792
							0.1301

0.1301 / 7 = 0.0186 = [ANTILOG = 1.0437]

1969 FIELD = 6.60 mV/m

1994 FIELD = 6.60 X 1.0437 = 6.89 mV/m

Fields measured May 18,19, 1994



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TABULATION OF FIELD INTENSITY MEASUREMENTS FOR ANTENNA PARTIAL PROOF-OF-PERFORMANCE

KIOS - BAY CITY, TEXAS
1270 KHZ, 1.0 KW, DA-N

RADIAL 17.7 DEGREES TRUE

POINT	MILES/KILOMETER		TIME	1969 FIELD	1994 FIELD	RATIO Of FIELDS	LOG Of FIELD
5	3.10	4.99	1420	3.00	3.15	1.0500	0.0212
6	3.45	5.55	1430	1.90	2.10	1.0553	0.0435
7	4.75	7.54	1502	1.60	1.75	1.0938	0.0389
8	5.35	8.61	1440	1.20	1.10	0.9167	-0.0378
9	6.85	11.02	1400	0.80	1.05	1.3125	0.1181
10	7.00	11.27	1338	0.90	0.53	0.5889	-0.2300
11	7.35	11.83	1305	0.90	0.60	0.6667	-0.1761
12	7.90	12.71	1205	0.84	0.66	0.7857	-0.1047
13	13.40	21.57	1200	0.30	0.35	1.1667	0.0669
							-0.2600

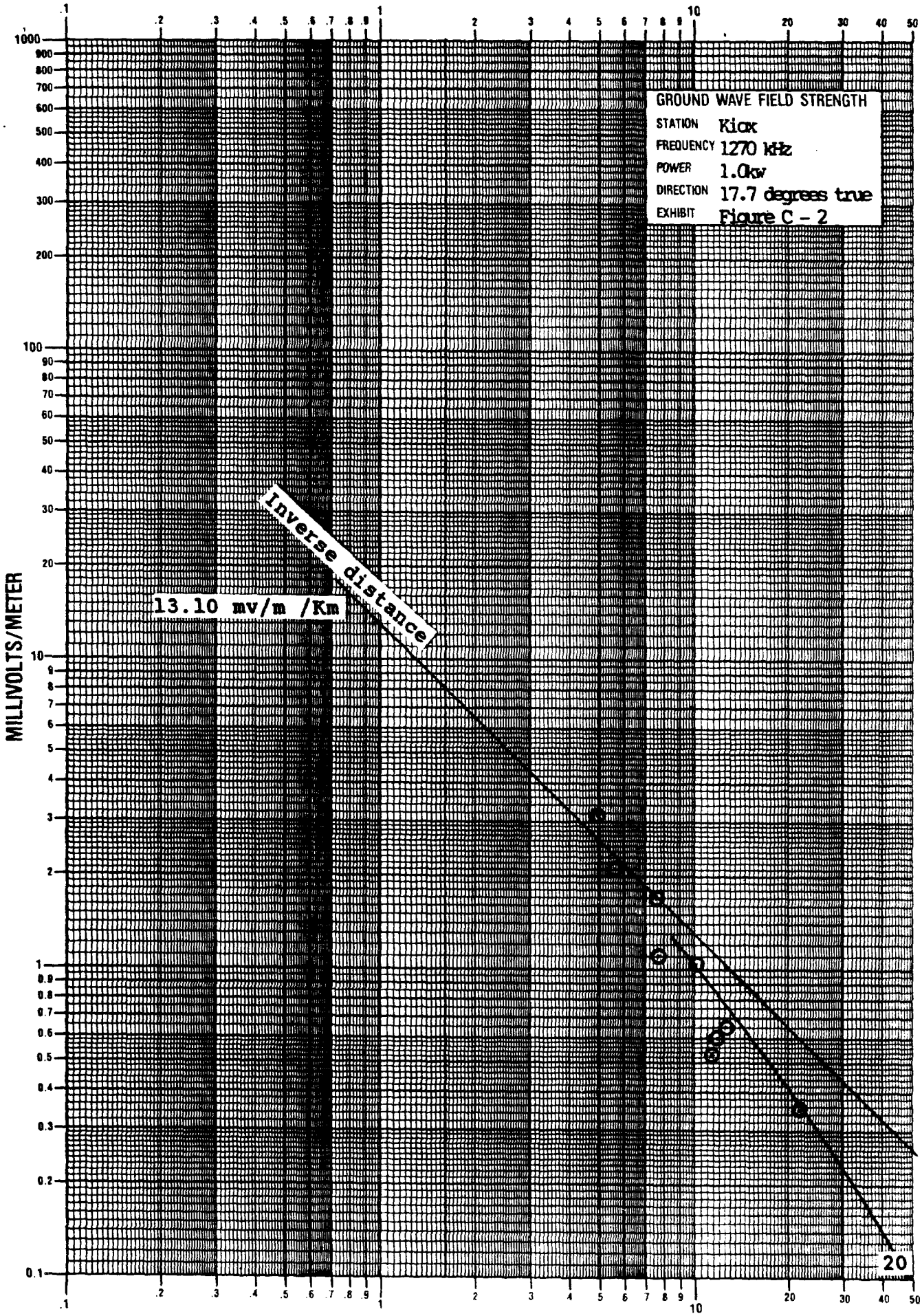
-0.2600/9 = -0.0289 [ANTILOG = 0.9356]

1969 FIELD = 8.70 mV/m

1994 FIELD = 8.70 X 0.9356 = 8.14 mV/m

Fields measured May 18, 19, 1994

KILOMETERS FROM ANTENNA



KILOMETERS FROM ANTENNA

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TABULATION OF FIELD INTENSITY MEASUREMENTS FOR ANTENNA PARTIAL PROOF-OF-PERFORMANCE

KIOX - BAY CITY, TEXAS
1270 KHZ, 1.0 KW, DA-N

86 DEGREES TRUE

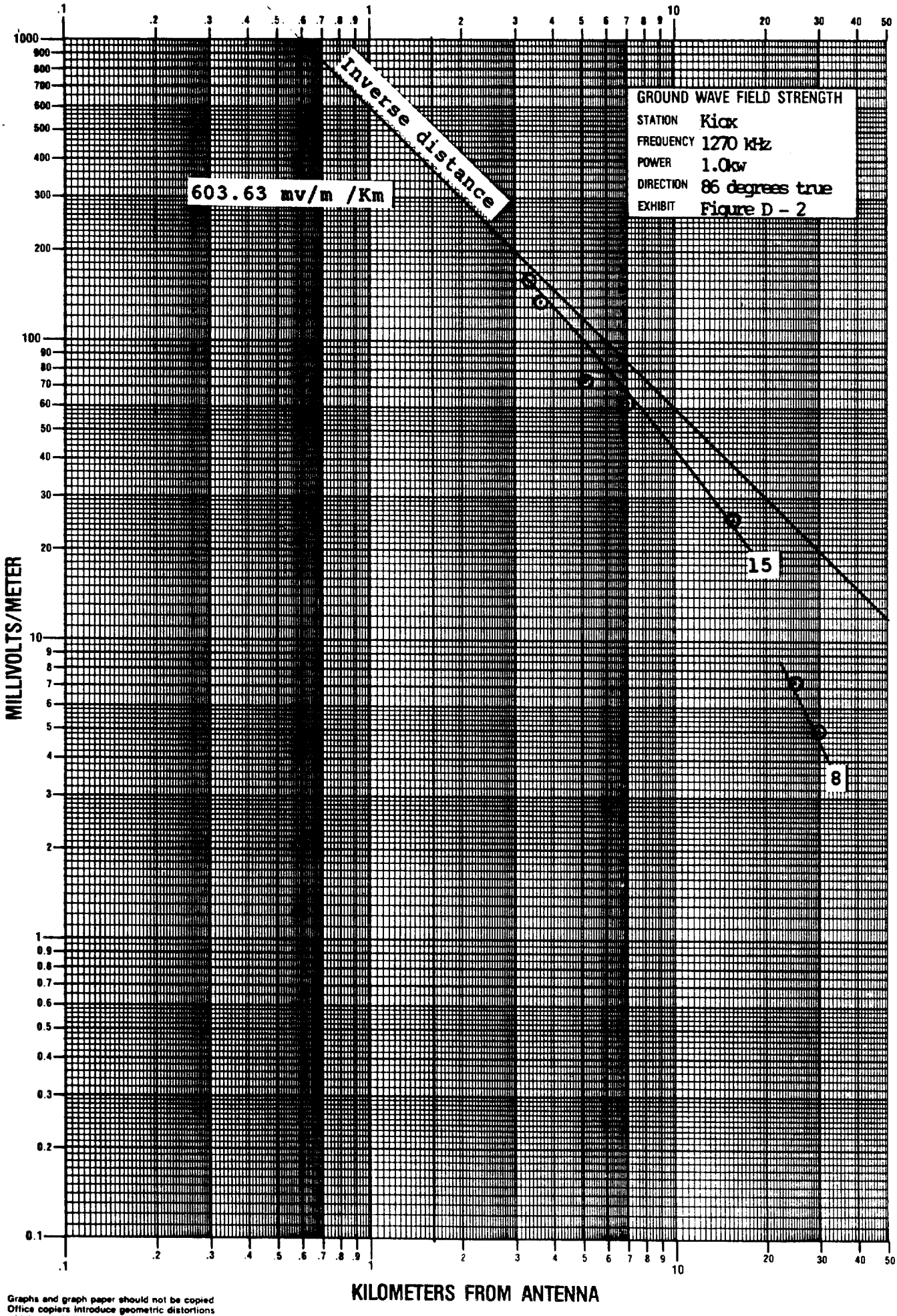
POINT	MILES\KILOMETERS		TIME	1969 FIELD	1994 FIELD	RATIO OF FIELD	LOG Of RATIO
3	2.05	3.30	1540	155.0	159.0	1.0258	0.0111
4	2.25	3.62	1547	140.0	135.0	0.9643	-0.0158
5	3.80	6.12	1600	70.0	74.0	1.0571	0.0241
6	4.35	7.00	1630	65.0	63.0	0.9692	-0.0136
8	9.60	15.45	1701	24.0	25.5	1.0625	0.0263
10	15.50	24.94	1739	7.60	7.3	0.9605	-0.0175
11	18.60	29.93	1018	4.70	5.0	1.0638	0.0269
							0.0415

0.0415/7 = 0.0059 = [ANTILOG = 1.0137]

1969 FIELD = 370.0 mV/m

1994 FIELD = 370.0 X 1.0137 = 375.07 mV/m

Fields measured May 19, 20, 1994



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TABULATION OF FIELD INTENSITY MEASUREMENTS FOR ANTENNA PARTIAL PROOF-OF-PERFORMANCE

KIOX - BAY CITY, TEXAS
1260 KHZ, 1.0 KW, DA-N

108 DEGREES TRUE

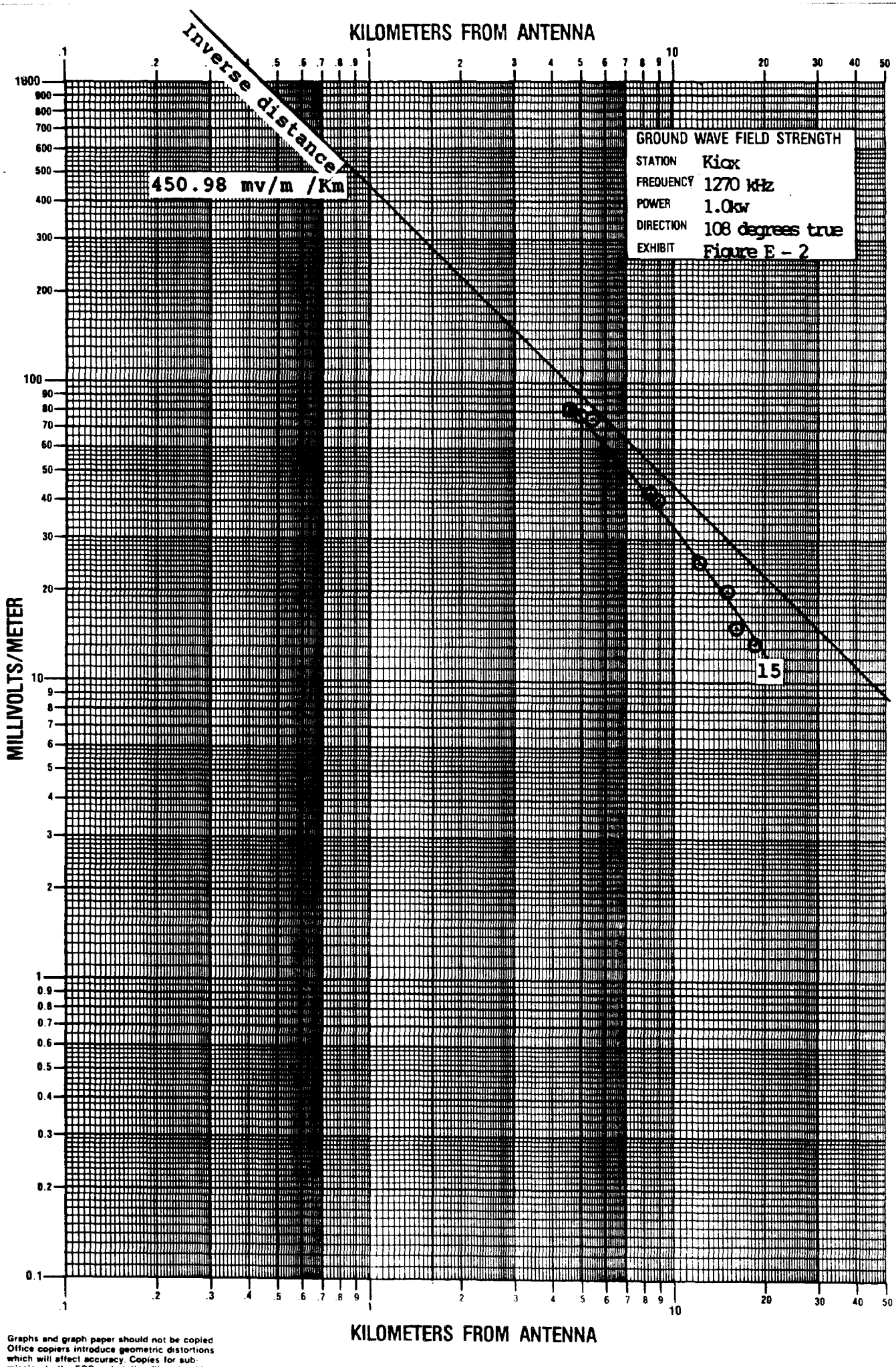
POINT	MILES/KILOMETER		TIME	1969 FIELD	1994 FIELD	RATIO of FIELDS	LOG of RATIOS
4	2.80	4.51	1100	84.0	83.0	0.9881	-0.0052
5	3.05	4.91	1106	78.0	77.5	0.9936	-0.0028
6	3.35	5.39	1125	74.0	76.0	1.0270	0.0116
7	5.15	8.29	1150	42.0	43.0	1.0238	0.0102
8	5.50	8.85	1215	40.0	40.5	1.0125	0.0054
10	7.60	12.23	1231	24.5	25.1	1.0245	0.0105
11	9.25	14.89	1243	19.0	20.2	1.0632	0.0266
12	10.05	16.17	1250	16.0	15.2	0.9500	-0.0223
13	11.5	18.51	1300	14.5	13.5	0.9310	-0.0310
							0.0030

0.0030/9 = .0003 [ANTILOG = 1.0008]

1969 FIELD = 280 mV/m

1994 FIELD = 280 X 1.0008 = 280.22 mV/m

Fields measured May 20, 1994



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TABULATION OF FIELD INTENSITY MEASUREMENTS FOR ANTENNA PARTIAL PROOF-OF-PERFORMANCE

KIOX - BAY CITY, TEXAS
1270 KHZ, 1.0 KW, DA-N

162 DEGREES TRUE

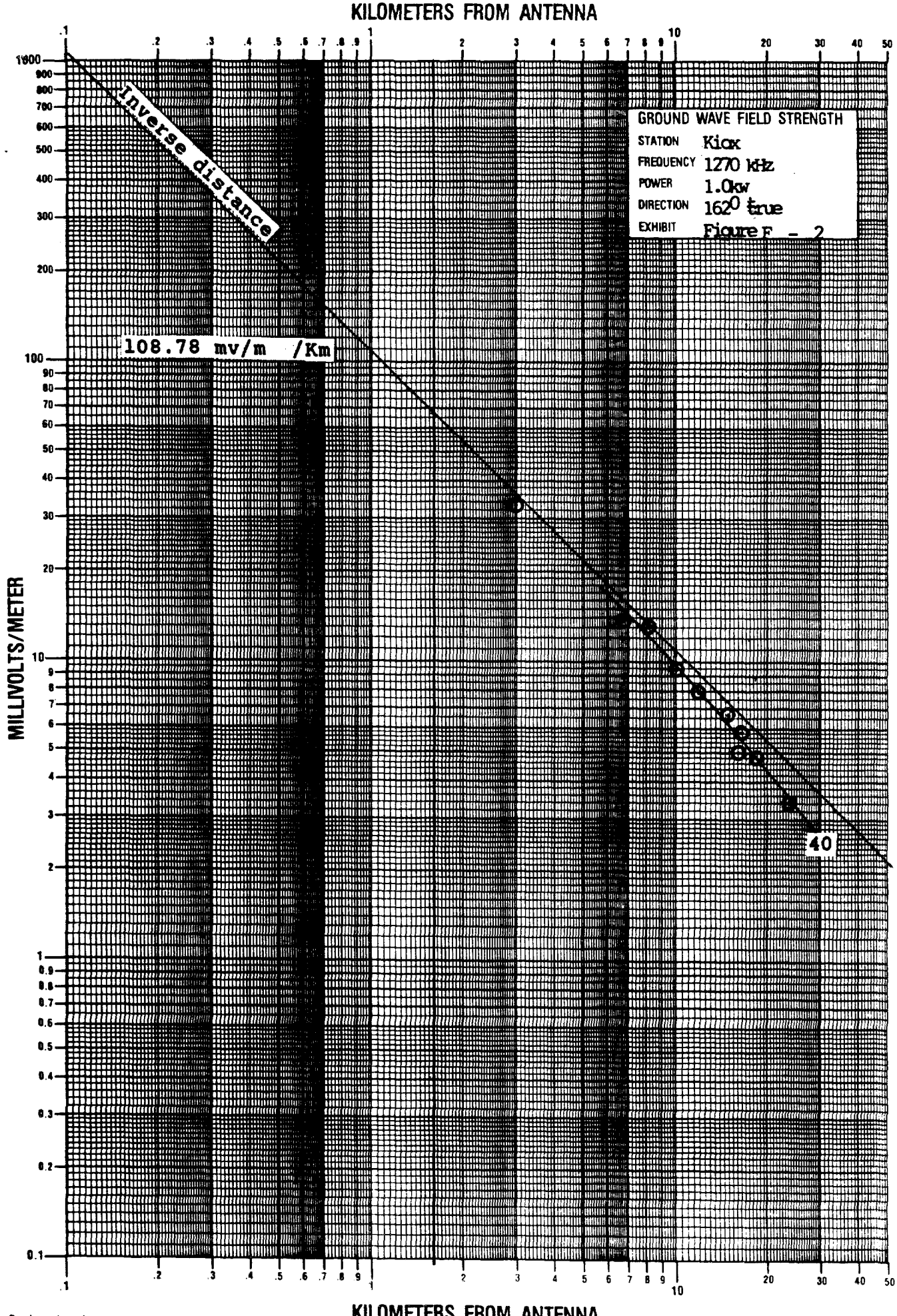
POINT	MILES/KILOMETERS		TIME	1969 FIELD	1994 FIELD	RATIO Of FIELDS	LOG Of RATIOS
3(MP)	1.85	2.98	1112	33.0	32.86	0.9958	-0.0018
5	4.15	6.68	1550	15.0	13.7	0.9133	-0.0394
6	5.10	8.21	1334	12.5	13.2	1.0560	0.0237
7	6.25	10.06	1344	9.20	9.40	1.0217	0.0093
8	7.20	11.59	1350	7.30	7.90	1.0822	0.0343
9	9.15	14.73	1404	7.10	6.70	0.9437	-0.0252
10	10.20	16.42	1414	6.40	5.80	0.9063	-0.0428
11	11.45	18.43	1425	5.30	4.90	0.9245	-0.0341
12	14.40	23.17	1435	3.20	3.40	1.0625	0.0263
13	14.60	23.50	1449	3.00	2.90	0.9667	-0.0147
							-0.0644

-0.0644/10 = -0.0064 [ANTILOG = 0.9853]

1969 FIELD = 68.60 mV/m

1994 FIELD = 68.60 X 0.9853 = 67.59 mV/m

Fields measured May 20, 1994



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TABULATION OF FIELD INTENSITY MEASUREMENTS FOR ANTENNA PARTIAL PROOF-OF-PERFORMANCE

KIOX - BAY CITY, TEXAS
1270 KHZ, 1.0 KW, DA-N

RADIAL 200 DEGREES TRUE

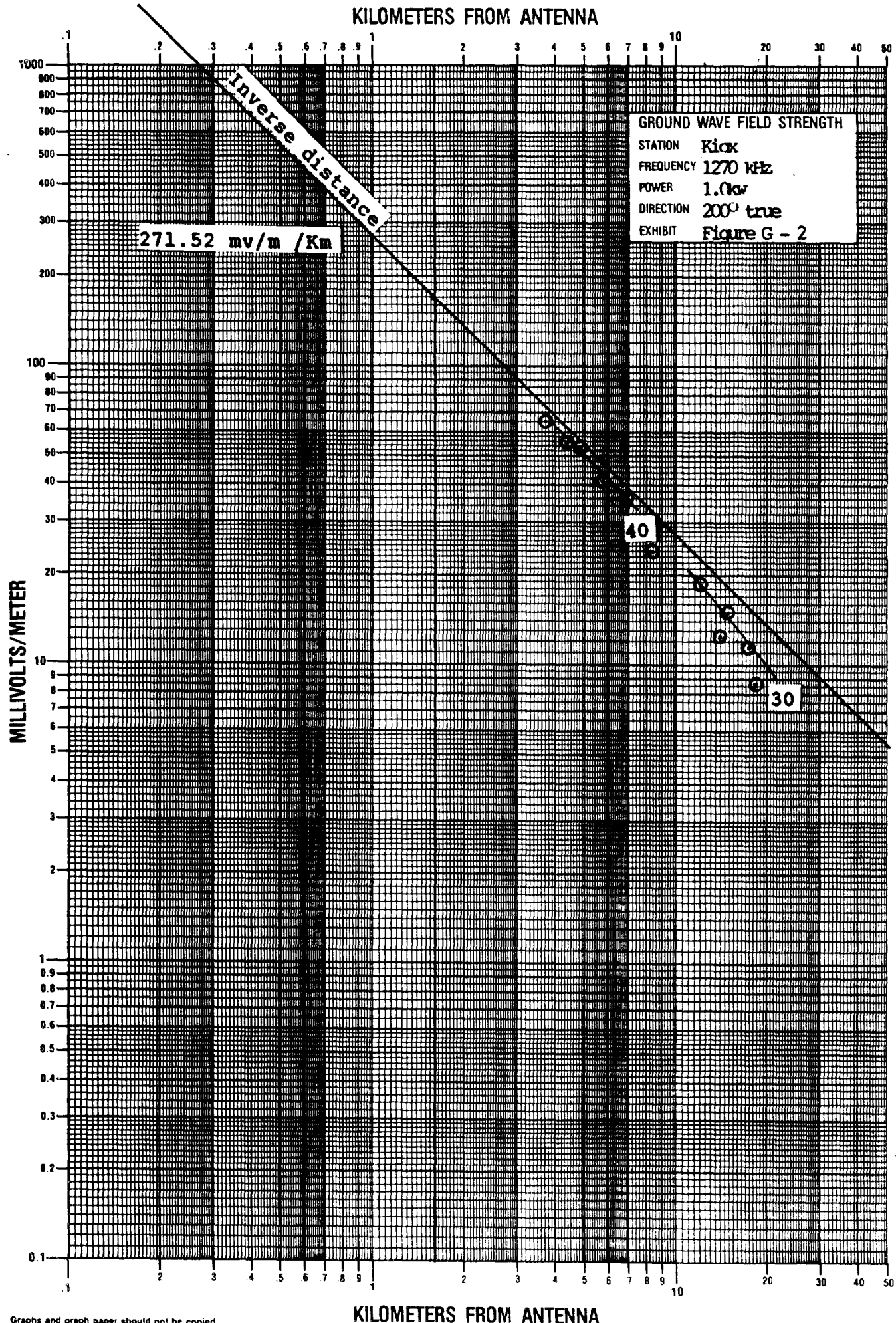
POINT	MILES/KILOMETERS		TIME	1969 FIELD	1994 FIELD	Ratio Of FIELD	Log Of RATIOS
5	2.30	3.70	1255	65.0	65.0	1.0000	1.0000
6	2.70	4.35	1301	56.0	55.0	0.9821	-0.0078
7	3.05	4.91	1306	50.0	53.0	1.0600	0.0253
8	3.55	5.71	1314	42.0	43.5	1.0357	0.0152
9	4.30	6.92	1323	35.0	35.0	1.0000	0.0000
10	5.20	8.37	1343	25.0	24.0	0.9600	-0.0177
11	7.45	11.99	1358	16.0	18.6	1.1625	0.0654
12	8.50	13.68	1412	13.0	12.5	0.9615	-0.0170
13	9.25	14.89	1420	17.0	15.0	0.8824	-0.0544
14	10.75	17.30	1448	12.0	11.4	0.9500	-0.0223
15	11.45	18.43	1440	7.3	8.7	1.1918	0.0762
							0.0629

0.0629/11 = 0.0057 = [ANTILOG = 1.0133]

1969 FIELD = 166.5 mV/m

1994 FIELD = 166.5 X 1.0133 = 168.71 mV/m

Fields measured May 22, 1994



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TABULATION OF FIELD INTENSITY MEASUREMENTS FOR ANTENNA PARTIAL PROOF-OF-PERFORMANCE

KIOX - BAY CITY, TEXAS
1270 KHZ, 1.0 KW, DA-N

RADIAL 240 DEGREES TRUE

POINT	MILES/KILOMETERS		TIME	1969 FIELD	1994 FIELD	Ratio Of FIELDS	Log Of FIELDS
5	2.35	3.78	1130	140.0	140.0	1.0000	0.0000
6	2.85	4.59	1138	125.0	122.0	0.9760	-0.0106
7	3.00	4.83	1149	105.0	102.0	0.9714	-0.0126
8	3.20	5.15	1202	98.0	96.0	0.9796	-0.0090
9	3.35	5.39	1211	110.0	104.0	0.9455	-0.0244
10	3.60	5.79	1220	90.0	92.0	1.0222	-0.0095
11	3.75	6.04	1233	81.0	80.0	0.9877	-0.0054
12	4.00	6.44	1320	77.0	75.0	0.9740	-0.0114
13	4.10	6.60	1325	71.0	79.0	1.1127	0.0464
14	4.65	7.48	1335	88.0	81.0	0.9205	-0.0360
15	4.80	7.72	1348	62.0	58.0	0.9355	-0.0290
							-0.0825

-0.0825/11 = -0.0075 [ANTILOG = 0.9829]

1969 FIELD = 374.0 mV/m

1994 FIELD = 374.0 X 0.9829 = 367.60 mV/m

Fields measured May 23, 1994